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MICRO-LEVEL ANALYSIS
(CASE STUDIES)

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1. Introduction
2. Village Nitavade
3. Village Darwad

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1. INTRODUCTION :

In the previous chapters an attempt has been made to examine the spatial pattern of physical conditions, the pattern of irrigation and the impact of irrigation on crop productivity, fertilizer, mechanization and cropping pattern. A micro-level (village level) analysis of these aspects is discussed in this chapter which may give the representative picture of the region under study. Two villages are selected as case study villages, one from traditional irrigated area and another from newly developing area in irrigation.

The landuse cropping pattern for 1960-61 and 1986-87, of both the villages, was recorded on the cadastral maps obtained from the village Talathi records (Revenue Officer) of the respective villages. The interviews of the farmers and other relevant persons were conducted to generate the data relating to irrigation, cropping pattern, yield, fertilizer consumption, water supply, use of implements etc. Such plot-to-plot study is essential for it acts as a supplement to a check upon the broad picture and general conclusions outlined in the preceeding chapters (Mac Master, 1962). The following analysis is concerned with the study of two villages, viz. Nitavade and Darwad (Fig.3.1-B).

1. NITAVADE :

1) Site and situation :

Nitavade village is located in the central part of the study region (Fig.3.1-B). It is situated on the left bank of Vedganga river at a height of 580 metres above mean sea level. It has 392 hectares of geographical area associated with two nalas in the north and the south and hills to the west.

2) Physical setting :

The village area can be divided into three physical divisions :-

- 1) Western hilly region : The hills follow the north-south direction in the west inclined east-westwards in the northern part forming a considerable extensive tableland. It covers about 50 percent of the total village area.
- ii) Foot-Hill zone : It covers 35 percent of village area which is moderately steep. The terraced cultivation has been developing since the recent past.
- iii) Plain region : It includes narrow flood plain of Vedganga river and the narrow flat area of the two nalas and covers a small part (15%) of the village area. Its gently sloping land favours the development of irrigation facilities.

3) Climate :

The isohyetal line of 2500 mm value crosses the village. Almost all rainfall occurs in June to September from southwest monsoon with a heavy concentration in August. The hottest months are April and May and the coldest being December and January.

4) Soils :

The village possesses the following three soil types (Fig.4.3-B).

- i) Alluvial soils : It covers only 10 percent of the total area of the village and occupies the flood plain of the River which is the only fertile and productive land of the village.
- ii) Medium and Deep laterite : It is stretched along with both the nalas of the village and covers 21 percent of the village area. Though not fertile, these soils yield satisfactory when water is provided.
- iii) Coarse shallow laterite : An extensive tract (69 percent) is covered by this group which is infertile and mostly devoted to grasslands.

5) Water Resources :

The water resources, surface and ground water, are comparatively rich in the village area. The surface water of the village includes the Vedganga river and the two nalas.

Vedganga is almost perennial due to the water storage made by nearby Kumbharwadi K.T.Weir. The nalas get dried after March. The ground watertable in post-monsoon season (November) is at surface level and in pre-monsoon it deepnes to about 5 metres in the village area.

6) Agricultural profile :

The physiography largely controls the agriculture and irrigation development of the village. Some aspects of agriculture and the socio-economic conditions are noted briefly.

1) Landuse : The landuse pattern of the village shows a typical example of river basin in its upper part.

TABLE 4.1 : General landuse pattern of village Nitavade 1986-87.

Sr. No.	Land category	Area in Hect.	Percentage to total
1	Forest	182	46.42
2	Area not available for cultivation	15	3.81
3	Cultivable waste	11	2.80
4	Fallow	23	5.85
5	Pastures	11	2.80
6	Net area sown	152	38.77
Total		392	100.00

SOURCE : Compiled by the Author, 1987.

The hilly and narrow flood plain topography is reflected in the general landuse of the village where the forest covers considerable part of the total land. The cultivated land is the same (38.77%) that of the regions average (38.57%) in 1986. The other categories cover 15 percent of the total land.

ii) Cropping pattern : The cropping pattern of the village is similar to our nation's rural agricultural cropping which is dominated by food crops.

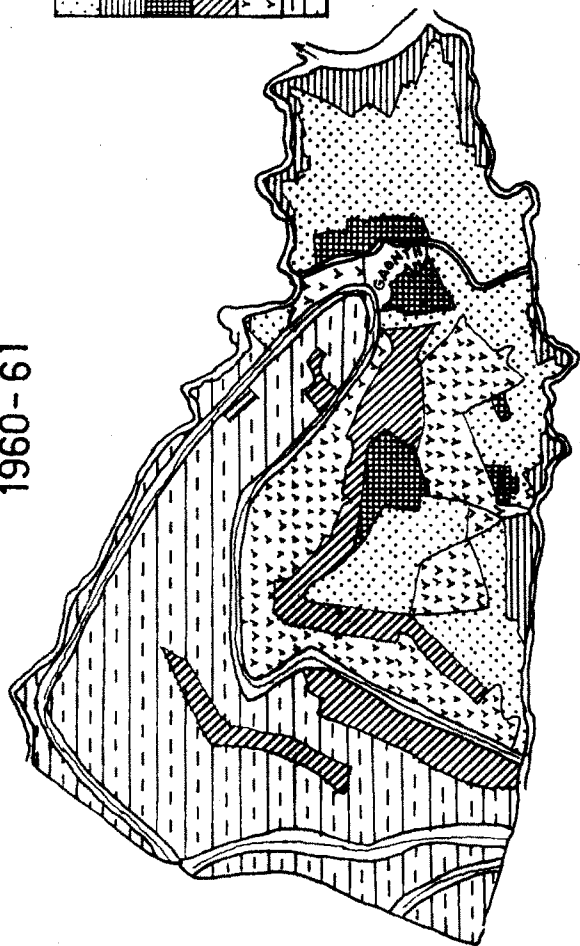
TABLE 4.2 : Cropping pattern in Nitavade village,
1986-87.

Sr. No.	Crops	1 9 6 0 - 6 1		1 9 8 6 - 8 7	
		Area in hect.	Percentage to net area sown	Area in hect	% to net area sown
1	Rice	60	45.80	65	47.76
2	Nachani	35	26.71	40	26.31
3	Sugarcane	14	10.68	27	17.76
4	Groundnut	7	5.34	3	1.97
5	Pulses	1	0.76	5	3.28
6	Fodder crops	11	8.40	8	5.26
7	Wheat	9	6.87	13	8.55
8	Other crops	4	3.05	7	4.60

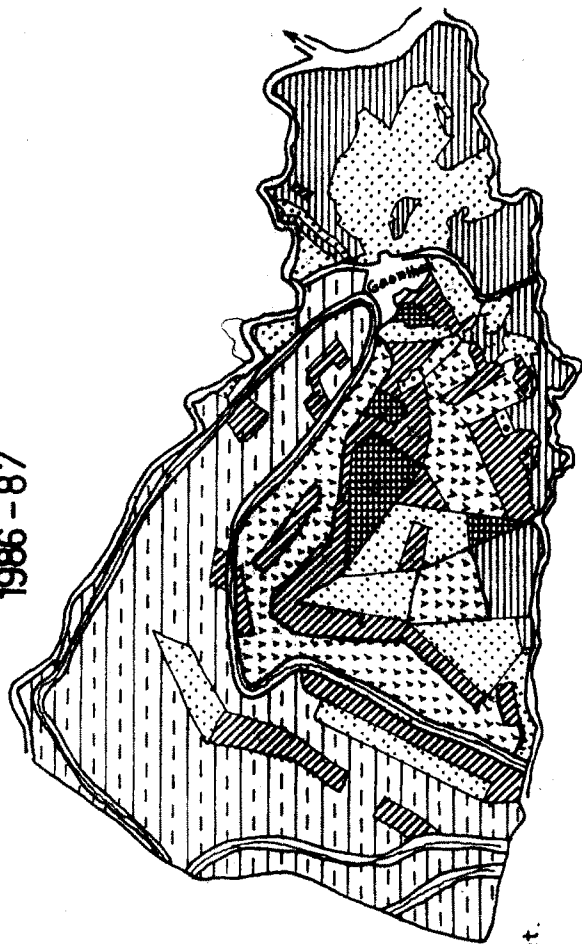
SOURCE : Compiled by the Author, based on field work, 1987.

VILLAGE NITAVADE KHARIF CROPPING PATTERN

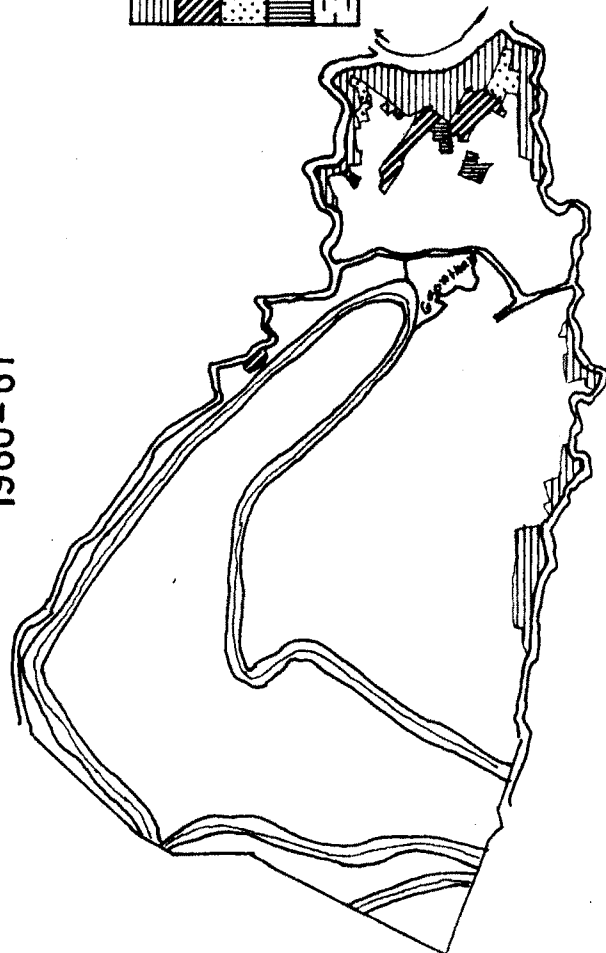
(A)
1960-61



(B)
1986-87



(C)
1960-61



IRRIGATED CROPPING PATTERN

(D)
1986-87

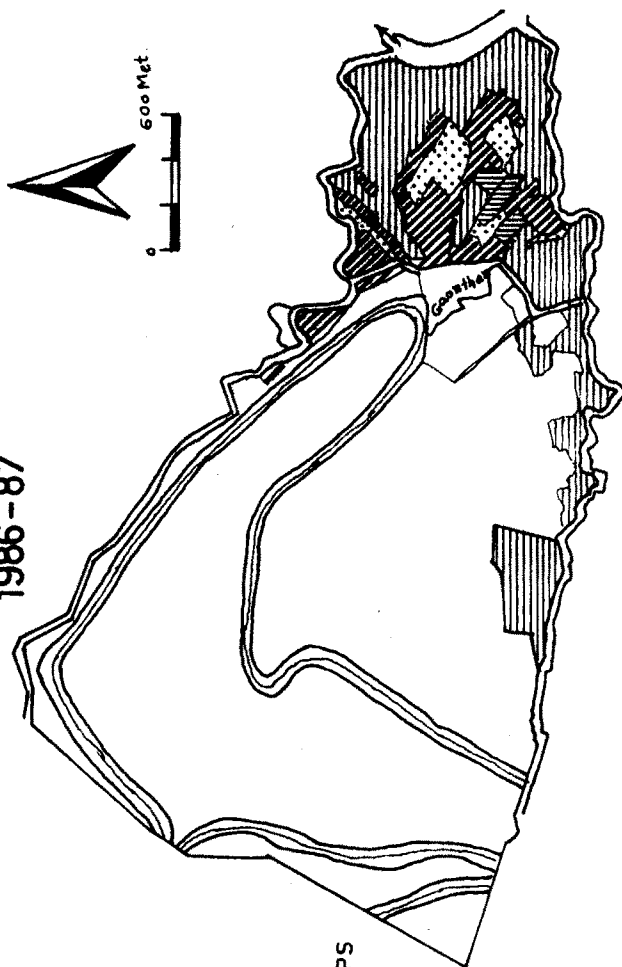


Fig.4.1

Table 4.2 shows that rice ranks first following nachani and sugarcane. Being a hilly region, nachani, grasslands have also considerable share in cropping pattern of the village. Fig.4.1-G shows that the flood plain of the village is intensively cultivated where sugarcane, rice and rabi crops are grown. Table 4.2 and Figs 4.1-A and B indicate that the change in sugarcane during the period is notable rather than the food crops.

iii) Population :

The population of the village was 683 (1981) consisting of 383 males and 316 females. The main occupation of the people is agriculture. The man-land ratio of the village is 1:0.42 and per head cultivated land is about 0.22 hectare. The village is electrified and having good drinking water supply. The literacy is 32 percent which is below regions average (37%).

iv) Agricultural Implements :

The main occupation of the people is agriculture which is at its traditional stage. The village has very little scope in the use of modern implements because the fertile cultivated area is very limited. It has 5 electric motors, 9 diesel engines, 4 threshers and 350 wooden and iron plough.

2. SOURCES OF IRRIGATION :

Three sources of irrigation i.e. lift, well and other are found in the village area. Lift irrigation is the dominant

source covering about 81 percent of the total irrigated area of the village. It follows other sources (11.90%) and well irrigation (7.15%). There are nine irrigation schemes on the river and southern-nala. The village has 3 perennial wells being utilized for irrigation. The water of the nalas in north and south is used to irrigate sugarcane and wheat fields.

1) Intensity of Irrigation :

The intensity of irrigation of the village is 27.63 percent which markedly varies spatially. The eastern side of the village is highly developed in irrigation due to the river water and good soil. The western part from the village is steepy, infertile and unfavourable for the development of irrigation facilities.

ii) Impact of Irrigation :

a) Irrigation and Agricultural Productivity :

There is much variation in agricultural productivity as it is found in broad patches which is mainly related to irrigation and soil conditions. The overall productivity of the area (Fig.4.3-D) is grouped into three categories i.e. high, moderate and low.

High productivity zone :

The high productivity (ranking co-efficient 2) is observed in the eastern part, particularly along the river course, associated with the alluvial soil (Fig.4.3-D). The

river remains almost perennial and hence the farmers enjoy more than 8 turns of irrigation. This zone is mostly devoted for sugarcane cultivation where average per hectare yield of sugarcane is 80 tons when the region's average is 43.66 tons.

Moderate productivity zone :

The zone is observed along the nala in the south and in between the village settlement and high productivity zone. The eastern patch of this zone is mostly devoted to rabi crops. The declining fertility of soil in the west, less opportunity for more turns of irrigation in the irrigated area of the village have resulted into moderate productivity ranging the ranking co-efficient from 2.1. to 4 (Fig.4.3-D).

Low productivity zone :

This zone (ranking co-efficient below 4) comprises two locations, the first of which is observed at the foot-hills having moderate slope and the second is confined to the river bank. The soils in the foot-hills are comparatively inferior and inaccessible to the development of good irrigation system. The flood water is responsible for the low productivity at the river side.

b) Irrigation and fertilizer consumption :

Irrigation is positively correlated with the consumption of fertilizers in the village. The average fertilizer consumption per hectare of irrigated land in the village area is about

1.8 tons as it varies from 2.4 tons in sugarcane area in the east and 1.1 in the areas of rabi crops and 1.5 tons along the southern nala. The decrease in fertilizer consumption away from river course may be due to corresponding decrease in irrigation.

c) Irrigation and mechanization :

Mechanization of agriculture is the essential characteristic of irrigated areas. The irrigated area has been increased twice since 1960-61 (Table 4.2). It might have resulted into the improvement in farmers attitude and income. It is reflected in the use of modern farm implements like electric motors, threshers, tractors etc. It is observed that the diesel engines were the important device of lifting water before 1960-61 due to the absence of rural electrification in the village. But in 1986-87 the number of electric motors and threshers were 5 and 4 respectively which were quite absent in 1960-61. Another fact is that though the village has no tractor, the farmers use it on hired bases. All this has influenced on agricultural productivity of the village.

d) Irrigation and irrigated cropping pattern :

The development of irrigation leads to change in cropping pattern. Table 4.3 reveals the temporal change in irrigated cropping pattern. The area under sugarcane in this village is increased by 92.85 percent to that of 1960-61

as compared to when the region's average decline of 4.84 percent. The highest net increase in hectarage (200%) is recorded by wheat crop.

TABLE 4.3 : Irrigated cropping pattern in village Nitavade 1960-61 to 1986-87.

Sr. No.	Crops	1960-61		1986-87		Net increase in %
		Area in hect.	% to total irrigated area	Area in hect.	% to total irrigated area	
1	Sugarcane	14	66.66	27	64.28	92.85
2	Wheat	3	14.30	9	21.42	200.00
3	Maize	1	4.76	2	4.76	100.00
4	Gram	2	9.52	3	7.14	50.00
5	Other	1	4.76	1	2.43	Nil
Total		21	100.00	42	100.00	100.00

SOURCE : Compiled by the Author, based on the field data, 1987.

It may be attributed to the development of irrigation facilities occurred fostered nearby construction of Karadwadi K.T.Weir. Not only sugarcane but the other irrigated crops also show remarkable increase in their hectarage during the period under investigation. Fig.4.1-C and 4.1-D show the spatial

change in the irrigated cropping in the village area. The sugarcane has kept its dominancy in the irrigated cropping pattern as it covers above 64 percent of the total irrigated area of the village.

2. VILLAGE DARWAD :

1) Location :

The village Darwad is located in the lower part of Upper Vedganga basin, at a distance of 5 kms from taluka place, Gargoti (Fig.3.1-B). It is situated on the left bank of the river, at the height of 540 metres above mean sea level covering about 289 hectare area.

2) Physical setting :

The village area is generally flat with a gentle slope towards the east. The slope in the western part of the village area is having comparatively steeper slope than the east. The western portion, nearer to foot hills has developed into terraced cultivation where rice dominates. The eastern part of the village area is the flood plain where deposited soils have attain high fertility favouring the cultivation of sugarcane and other crops. Naturally, this zone possesses high agricultural productivity.

3) Climate :

The village receives rainfall from southwest monsoon which is about 1600 mm. The heavy rain occurs in the month

of August. The hottest months are April and May and the coldest are December and January.

4) Soils :

The following are the main soil groups in the village area (Fig.4.3-A).

- i) Alluvial soil :- This soil is confined to the eastern part of the village area, particularly the eastern portion from 'Gaonthan'. It is locally known as 'Malvi' which is light brown in colour and fertile and productive.
- ii) Black soil :- It is a medium deep black soil and covers, particularly the western parts of the village area from 'gaonthan'. The crops like rice, pulses, kharif jowar are grown in this fertile soil.
- iii) Coarse shallow soil :- It covers a small portion of the west. These are infertile and mostly devoted to grass-lands. Rice is grown where the land is brought under terraces.

5) Water Resources :

The village is having satisfactory water resources. The surface water resources are seasonal and available in the form of Vedganga river to the east and two nalas in the north and south of the village area. The water in Vedganga is stored with the help of Nilpan K.T.Weir. Hence, the river course at Darwad remains perennial upto mid-March. The nalas get dried

after January and the water of those is used for rabi crops. The ground watertable during post-monsoon season (November), is at surface level but in pre-monsoon (May) it goes down upto 5 metres to the eastern portion and 8 metres to the western portion of the village area.

6) Agricultural profile :

The agricultural activity in the village is controlled by the physico-socio-economic aspects. The agricultural and socio-economic aspects of the village in the recent past are discussed below.

1) Landuse :

The Table 4.4, shows the general landuse pattern of Darwad village area in 1986-87.

TABLE 4.4 : General landuse in Darwad village, 1986-87.

Sr. No.	Land Category	Area in hectare	Percentage to total area
1	Area not available for cultivation	08.00	2.76
2	Cultivable waste	10.00	3.46
3	Fallow	14.00	4.84
4	Pastures	09.00	3.12
5	Net area sown	248.00	85.82
Total			100.00

SOURCE : Compiled by the author. Based on the fieldwork, 1987.

The village area has no forest land as against to village Nitavade. Since, farming is the major activity of the village, the proportion of net area sown is high (85.82%). The other categories of land use cover only 14 percent of the total area (Table 4.4).

11) Cropping pattern :

The cropping pattern of the village consists mainly of the cultivation of food crops (Table 4.5).

TABLE 4.5 : Cropping pattern in Darwad village, 1986-87.

Sr. No.	Crops	Area in Hect.		Percentage to net area sown	
		1986-87	1960-61	1986-87	1960-61
1	Rice	148	132	59.67	54.55
2	Nachani	5	7	2.01	2.90
3	Groundnut	2	5	0.80	2.01
4	Sugarcane	62	73	25.00	30.16
5	Pulses	30	7	12.10	2.90
6	Grasslands	24	21	9.67	8.70
7	Wheat	15	9	6.04	3.72
8	Other crops	19	9	7.66	3.72

SOURCE : Compiled by the author. Based on the field work, 1987.

Table 4.5, indicates that rice is the dominant crop of the village which covers more than 54 percent of the net area sown. The second ranking crop is sugarcane (25%) and together with rice cover 84.67 percent of the net area sown in 1986-87. The hectarage under rice is increased whereas it is decreased in case of sugarcane. It is due to the scarcity of water in summer months which is resulted into the increase in irrigated rabi crops (Table 4.5). The wheat, pulses, jowar, gram are the major rabi crops in the village. The Figs.4.2-A and 4.2-B show the spatial change of kharif crop landuse.

iii) Population :

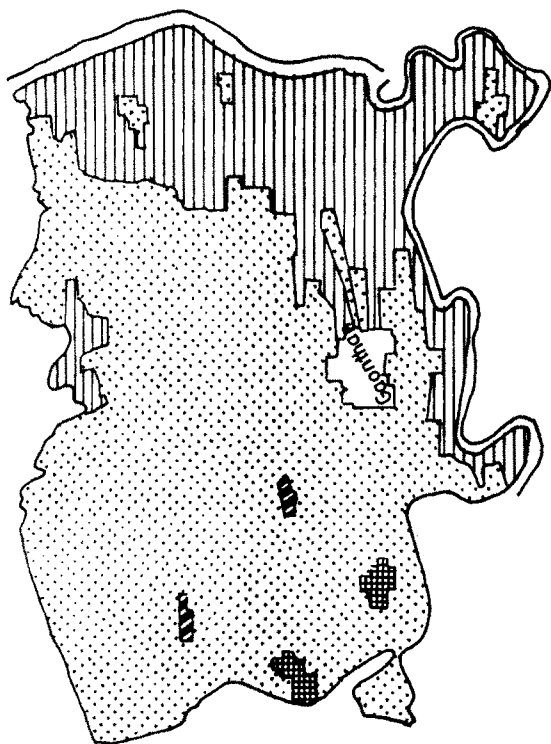
The population of the village was 1340 (1981 census) including 710 males and 630 females. Majority of the people are engaged in agriculture. The ratio of land available per head is 0.21 hectare and cultivated land is about 0.18 hectare. The literacy of the village is high (47%) as compared to the region's average (35%). It has 630 literates consisting of 310 males and 120 females. It has 13 landless families. The disparity in farm possession is varied as 61% families possess below 1 hectare of land when 7 percent families possess 38 percent of cultivated land in the village. The village is electrified and having drinking water supply scheme.

iv) Agricultural Implements :

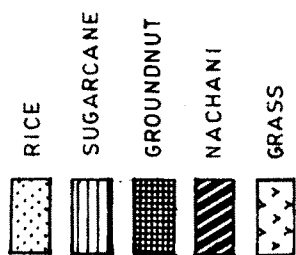
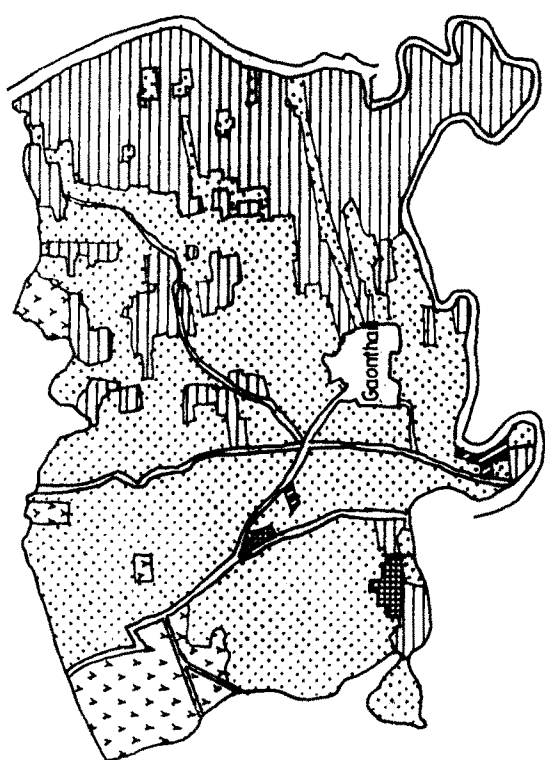
Main occupation of the village is agriculture. Recently there has been the development in the use of agricultural

VILLAGE DARWAD KHARIP CROPPING PATTERN

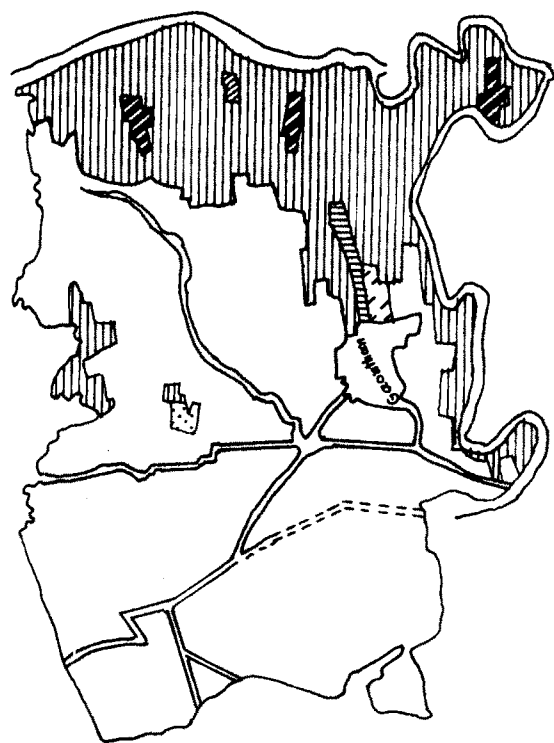
(A)
1960-61



(B)
1986-87



(C)
1960-61



IRRIGATED CROPPING PATTERN

(D)
1986-87

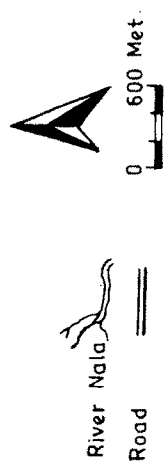
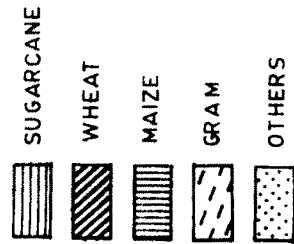
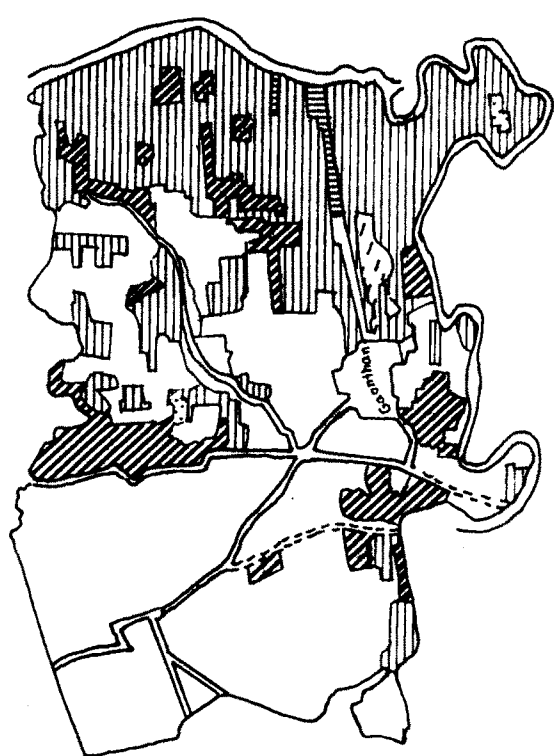


Fig.4.2

implements. There are 14 electric motors, 13 diesel engines, 12 threshers and 137 wooden and iron plough in the village.

vii) Sources of Irrigation :

The village Darwad has lift, well and other sources of irrigation. The total irrigated area is 89 hectares in 1986-87. Out of which 68 percent is under lift, 25 percent under wells and 7 percent under other sources of irrigation. The village has 21 lift irrigation schemes located on the bank of the river and on the southern nala. There are 11 irrigation wells in the village which are perennial but faces the problem of water scarcity during summer months. The water of the nalas is stores with the help of small earthen dams and provided to the rabi crops.

viii) Intensity of Irrigation :

The intensity of irrigation in the village is 36 percent. Fig.4.2-D shows that the intensity of irrigation is 100 percent in the eastern part of the village area whereas it decreases sharply towards the west. There is no irrigation in the far western portion of the village area.

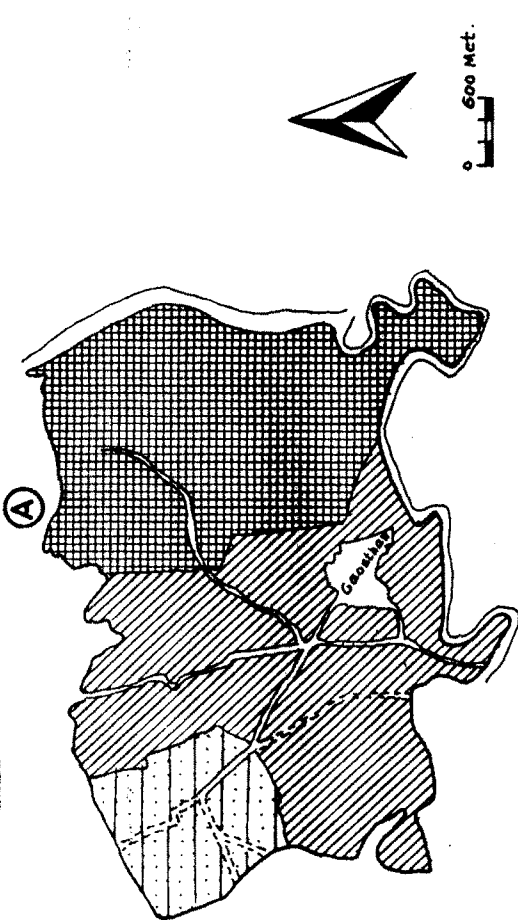
ix) Impact of Irrigation :

1) Irrigation and Agricultural productivity :

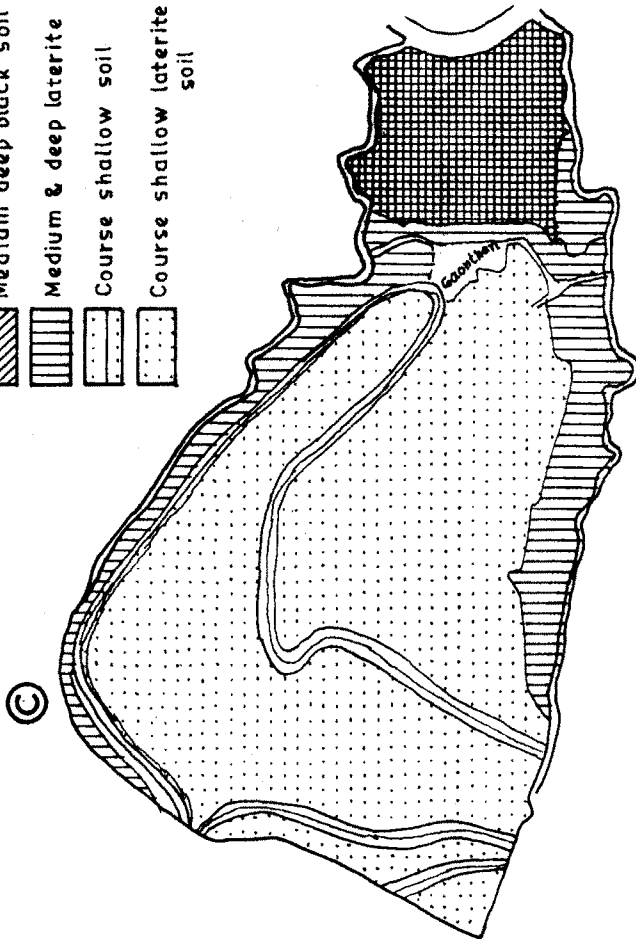
The Fig.4.3-C, shows the overall productivity of irrigated areas which can be grouped into three categories.

SOILS

VILLAGE DARWAD 1986-87

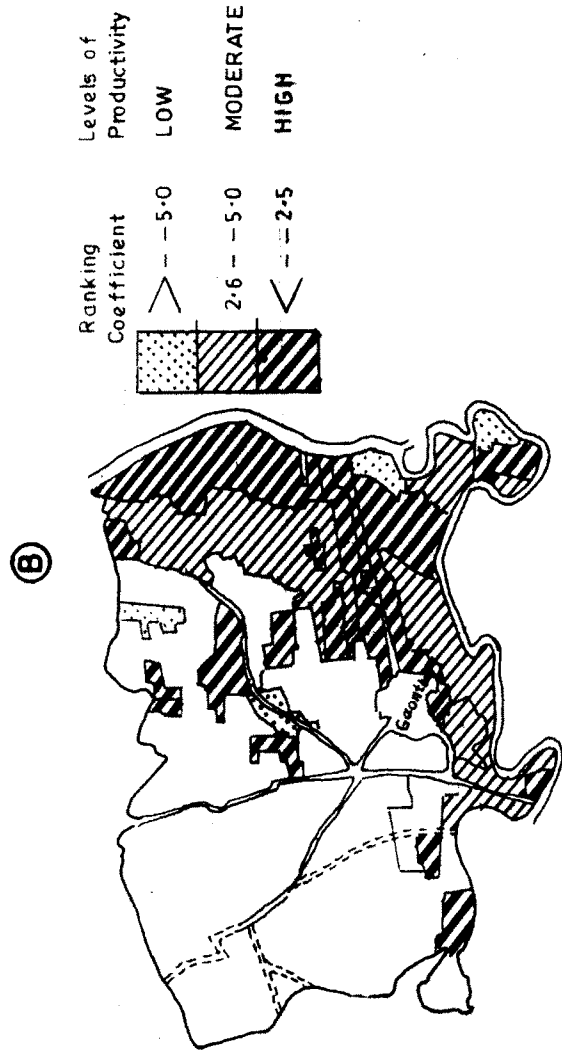


VILLAGE NITAVDE 1986-87



IRRIGATED CROP PRODUCTIVITY

VILLAGE DARWAD 1986-87



VILLAGE NITAVDE 1986-87

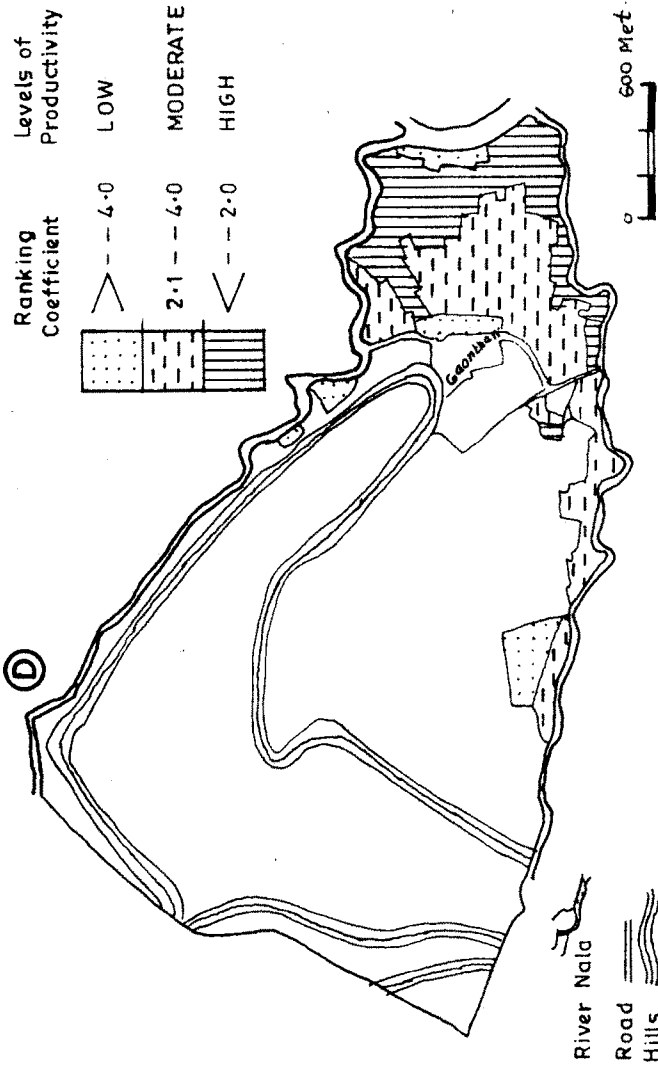


Fig. 4.3

a) High productivity zone :

It is mainly confined to the river side of the village area. Good alluvial soils, good water resources have resulted this zone into high productivity. The two patches of this category stretching from river to 'gaonthan' are owned by individual farmers who have their own irrigation schemes and therefore the farms enjoy more number of turns of irrigation. There are some patches of this category in the village area which are well irrigated where the farmers pay full attention to the farms and crops. Secondly, the wells being perennial, the farms receives more number of turns of irrigation. This zone of high productivity is mainly devoted to sugarcane cultivation.

Moderate productivity zone :

This zone is located at three different places (Fig. 4.3-C). The northern portion of this category is having good alluvial soils and the southern having medium deep black soils but both the areas face the water scarcity. In spite of having good soil and water for irrigation in the southwest portion of the village area, the attitude, ignorance of the farmers have resulted this part as moderate productivity zone.

Low productivity zone :

The low productivity is confined to the northern side and to the river and nala side. The flood water of river and

nala encroches upon the cultivated area destroying the crops. In the north, it is observed that the use of fertilizers is very less due to the poor economic conditions of the farmers.

ii) Irrigation and Fertilizer Consumption :

The average fertilizer consumption for the village per hectare of irrigated land is 1.3 tons which is varying from crop to crop and from plot to plot in the village area. It is observed that the fertilizer use for sugarcane is high (1.5 tons) in the areas near to the river course and in well irrigated areas whereas it decreases markedly (0.97 tons) in the areas of moderate productivity due to the scarcity of water.

iii) Irrigation and Mechanization :

Mechanization of agriculture is the essential characteristic of irrigated areas. Table 4.6, exhibits irrigated cropping pattern of Darwad, and points out that there is no remarkable increase in net irrigated area since 1960-61. But still it has certainly improved the farm income which has resulted into the much use of different machines. It is observed that there was not a single EM in 1960 which were replaced by DE. The picture was quite different in 1986 when the village had 14 electric motors, 13 diesel engines. The high use of electric motors have reduced the power cost, repair cost and ultimately the production cost. Secondly,

the number of harvestors in 1961 was nil when it was 12 in 1986. The use of tractors on hired bases has been increased.

iv) Irrigation and Irrigated cropping pattern :

The irrigated cropping pattern has been dominated by sugarcane since 1960-61 till today. The figures 4.2-C and 4.2-D show that the irrigated area is spatially extending towards the west because of the large scale irrigation schemes and construction of new irrigation wells.

TABLE 4.6 : Irrigated cropping pattern in Nitavade village, 1960-61 to 1986-87.

Sr. No.	Crops	1 9 6 0 - 6 1		1 9 8 6 - 8 7	
		Area in hect.	% to total irrigated area	Area in hect.	% to total irrigated area
1	Sugarcane	73	86.90	62	69.66
2	Wheat	5	5.95	15	16.86
3	Maize	3	3.57	4	4.49
4	Gram	2	2.39	5	5.62
5	Other	1	1.19	3	3.37
Total		84	100.00	89	100.00

SOURCE : Compiled by the Author. Based on the field data, 1987.

Table 4.6, shows that the traditional cropping pattern has undergone into changes through time. The sugarcane area is decreased by 11 hectares from 1960-61 when the wheat area has increased by 200 percent. The other irrigated crops have also shown an increasing trend. This change may be due to the scarcity of water to perennial crop like sugarcane and therefore, the farmers of the village have chosen alternatives to grow rabi crops which require less quantity of water.